

Claims

1 1. A method for the *in vitro* growth of stem cells which comprises culturing
2 islet cells from a mammalian species in a nutrient medium supplemented with normal
3 serum, allowing said islet cells to grow for at least about 3 weeks, and initiating
4 cellular differentiation into mature islet cells by refeeding said islet cell culture with
5 a nutrient medium supplemented with normal serum.

1 2. The method, according to claim 1, wherein the islet cells are human
2 islet cells and the serum is normal human serum.

1 3. The method, according to claim 1, wherein the islet cells are mouse
2 islet cells and the serum is normal mouse serum.

1 4. A method, according to claim 1, wherein said nutrient medium
2 comprises a high amino acid nutrient medium.

1 5. The method, according to claim 1, wherein the culture medium used
2 to refeed said cell culture further comprises glucose.

1 6. The method, according to claim 1, wherein differentiation of cultured
2 stem cells is initiated at about 4 to 5 weeks of culture growth by refeeding of said
3 islet cell culture with the nutrient medium supplemented with homologous normal
4 serum.

1 7. The method, according to claim 1, wherein after cell differentiation is
2 initiated by refeeding the culture, the culture is refeed at about one-week intervals

1 8. The method, according to claim 1, wherein the normal serum is
2 obtained from the same mammalian species from which the islet cells were obtained.

3 9. The method, according to claim 1, wherein islet-like tissue structure is
4 produced after differentiation of said islet cells.

1 10. An islet cell produced by the method of claim 1.

1 11. An islet-like tissue structure produced by the method of claim 9.

2 12. A method for producing an endocrine hormone wherein said method
3 comprises culturing islet cells from a mammalian species in a nutrient medium
4 supplemented with normal serum, allowing said islet cells to grow for at least about
5 3 weeks, and initiating cellular differentiation by refeeding said islet cell culture with
6 a nutrient medium supplemented with normal serum, and recovering said endocrine
7 hormone from said islet cell culture.

1 13. The method, according to claim 12, wherein said hormone is a human
2 hormone.

1 14. The method, according to claim 12, wherein said hormone is a mouse
2 hormone.

1 15. The method, according to claim 12, wherein differentiation is initiated
2 at about 4 to 5 weeks of culture growth by refeeding of said islet cell culture with said
3 nutrient medium supplemented with normal serum.

1 16. The method, according to claim 12, wherein said endocrine hormone
2 is selected from the group consisting of insulin, glucagon and somatostatin.

3 17. A method for producing a pancreas-like organ in a mammal which
4 comprises implanting an islet or an islet cell produced by the method of claim 1 into
5 the tissue of the mammal.

6 18. A method for treating pancreatic disease in a mammal which comprises
7 producing a pancreatic-like organ in the mammal *in vivo* according to the method of
8 claim 17.

1 19. A pancreas-like organ produced according to the method of claim 17.

1 20. The method, according to claim 1, wherein the mature islet cells
2 comprise cells selected from the group consisting of α cells, β cells and δ cells.

1 21. The method, according to claim 17, wherein said islet or islet cell
2 implanted into the mammal is autologous to the mammal receiving the implant.

1 22. The method, according to claim 17, wherein the mammal is a human.

1 23. The pancreas-like organ, according to claim 19, wherein said organ is
2 produced in a human.

1 24. A mammal having a pancreas-like organ produced according to the
2 method of claim 17.

1 25. A mammal, according to claim 24, wherein said mammal is a mouse.